

REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested in view of the foregoing amendments and discussion presented herein.

1. **Objection to Drawings.**

Figure 7 required correction by the Examiner because of the presence of a ? in place of an element number. In response, the Applicant submits herewith a substitute drawing for FIG. 7 with the proper element number 82 as required by the Examiner. No new matter has been added.

2. **Rejection of Claim 72 under 35 U.S.C. §112, second paragraph.**

Claim 72 was rejected under 35 U.S.C. §112, second paragraph as being indefinite. In particular, the Examiner stated that there was "insufficient antecedent basis for "said third drying zone." In response, the Applicant has amended Claim 72 to overcome the rejection.

3. **Rejection of Claims 31-80 under 35 U.S.C. § 103(a).**

Claims 31-33, 35-39, 59-61 and 69-80 were rejected under 35 U.S.C. § 103(a) as being obvious in view of newly discovered references *Oates* (U.S. No. 3,214, 844), *Lockwood* (U.S. No. 4,334,366) and *Geromini et al* (U.S. No. 5,911,488) in various combinations or in combination with *Scott* (U.S. No. 4,419, 834) previously cited by the Examiner. However, the Applicant respectfully submits that none of the combinations suggested by the Examiner render obvious the invention of the Applicant as claimed since all of the elements and limitations of the invention are not shown in the proposed combinations.

The new (and old) patents referenced by the Examiner are all variations on a theme of "fluid bed" type inventions well known in the art. *Scott* and *Geromini et al* disclose a stationary perforated table where heated air is forced through the perforations. *Oates et al* discloses an endless chain of boxes with perforated bottoms with heated air forced through the perforations. *Lockwood* discloses a perforated drum.

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With each of the cited references, the food material must become airborne as air is blown through the fluid bed. The material does not contact the perforated bed during use and the fluid bed does not provide a support structure or function. The floating material is moved along the length of the apparatus by paddles in Scott or Lockwood and there is no conveyor belt.

One disadvantage of fluid beds is that they require a threshold quantity of air directed through the bed at or above a threshold velocity in order for the apparatus to function. If the airflow is below the velocity and volume thresholds, then the material to be dried will not become airborne and the material will clump and will not dry properly or at all. Accordingly, there is a size and weight limitation in the type of material that can be dried in a fluid bed. For example, large material such as meat chunks or very fine particulate materials cannot be used with a fluid bed.

In contrast, the present invention does not have these threshold limitations and the airflow velocity and volume are about three times less than the requirements of a typical fluid bed as disclosed in Scott, Oates or Lockwood.

In addition, with fluid beds, the direction of the airflow must be from below and through the perforated table and out through the material to an exhaust. This feature requires significant volumes of heated air. The invention of the Applicant does not require that the heated gas be directed through the support substrate from the bottom or from any particular direction. Air can be directed from the sides, the bottom or from the top of the support substrate providing significant control over the drying conditions that is not available from fluid beds known in the art.

It can be seen below that the combinations of patents cited by the Examiner do not have all of the structural elements recited in the claims including ultrasound and a particulate support substrate. Nor is there any suggestion, incentive or motivation to provide these elements provided by the references and the rejections should be withdrawn.

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a) Rejection of Claims 31-33, 38-39, 59-61, 69-70, 73-74 and 77-79 under 35 U.S.C. § 103(a)

Claims 31-33, 38-39, 59-61, 69-70, 73-74 and 77-79 were rejected under 35 U.S.C. § 103(a) as being obvious and therefore unpatentable over *Oates* (U.S. No. 3,214, 844) in view of *Lockwood* (U.S. No. 4,334,366).

In support of the rejection, the Examiner stated that *Oates* provided a structure with all of the claimed features except an “ultrasound source” and “it would have been obvious...to incorporate the ultrasound source of *Lockwood et al* into the invention since both are directed to drying devices.” The Applicant respectfully disagrees that the combination discloses a “support substrate configured to separate and support pieces of a food product” or “an ultrasound source” as claimed by the Applicant and there is no suggestion, incentive or motivation to substitute a jet engine for the heating units of *Oates*.

As indicated above, *Oates* discloses a fluid bed design with a perforated conveyor. As seen in FIG. 2 of *Oates*, a burner 30 introduces heated air to a blower 36 that delivers air to a chamber 38 and the air is then forced through the perforations 70 of the conveyor section 58 (FIG. 3). *Lockwood*, on the other hand, does not have a blower since the heated air source is a pulse jet engine 23 (Col. 2, lines 35-45 and Col. 6, lines 59-61). The jet engine is fueled by “propane...gasoline, fuel oils, butane and producer gas.” (Col. 5, lines 28-30) and would be of questionable use on food because of potential contamination with hydrocarbons from the incomplete combustion of fuel.

Furthermore, there is no incentive or motivation to substitute the heat source of *Scott* or *Oates* with the jet engine of *Lockwood* because the emissions of the jet engine exceeds the “safe temperature” of the particles and therefore the source must be used with a rotating drum. At Col. 6, lines 23-33 of *Lockwood* it states: “Most...food products have an empirically defined ‘safe’ temperature above which the risk of damage or scorching ...with a conventional hot gas source becomes unacceptable. If the particles are not tumbled, the temperature must be further limited, because the first

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particles to contact the hot gases tend to scorch and burn,...unless the temperature of the pulsating hot gas is relatively low..." Accordingly, there is no incentive to make the combination of either Oates or Scott with Lockwood because the material would scorch and burn because of the exhaust temperatures and the absence of a rotating drum.

In addition, there is no incentive, motivation or suggestion, for substituting the burners 30 of Oates or Scott with the jet engine of Lockwood because the structure of Oates would not allow the combination to function. The volume of gases emerging from the jet engine into the Oates structure, for example, would create a back-pressure in chamber 28 of Oates and interfere with or prohibit the flow of air through the perforated conveyor belt. Consequently, no cycling air-flow can take place and the fluid bed function of Oates or Lockwood would not occur.

Also, the stated benefits of the pulsed gas emissions from the jet engine and the sonic noise, would be negated by the structure of Oates. Accordingly, there is no incentive, suggestion or motivation for the combination of Oates and Lockwood found in either patent.

In addition, the Applicant respectfully disagrees that the claimed temperature and air flow rates are trivial and "merely preferred methods of using the claimed apparatus." As discussed above, the fluid bed type of machines require a minimum threshold air flow rate in order to function i.e put the particles in motion and suspended in the air streams. The Oates fluid bed patent discloses flow rates of 800-900 to 3500 feet per minute and the flow rate of Lockwood is limited to the range of discharge from the size of jet engine selected. However, these flow rates are substantially higher than the rates recited in the Applicant's claims that are configured to force heated air through the conveyor and the support substrate without setting the substrate and material to be dried in motion. The approach of the Applicant is a significant benefit over the art because the total volume of heated air that is required is substantially less than what is required for a fluid bed.

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Furthermore, the combination of Lockwood and Oates does not disclose an "ultrasound source," and there is no suggestion, incentive, motivation or teaching found in either Lockwood or Oates to provide an ultrasound source. The Lockwood patent uses a pulsed jet engine to create heat and gas flow as well as high decibel noise directed to a rotating drum within a chamber. There is no mention of ultrasonic waves in the Lockwood patent. In fact, the Lockwood patent teaches the use of *sonic* waves and pulsed gas flows to dehydrate. At Col. 5, lines 63-65 of Lockwood, the sonic waves are described as being on "the order of several cycles to several thousand cycles per second..." and "resonate the particles at their natural frequencies..." Ultrasound, on the other hand is defined as having a minimum frequency greater than or equal to 20,000 cycles per second and presumably in excess of the "natural frequencies" of the particles. Therefore, Lockwood does not disclose, and actually teaches away from the use of ultrasonic frequencies.

Finally, although air contains nitrogen it also contains oxygen and it is not the same as nitrogen gas. Dehydration in the presence of an essentially inert gas such as nitrogen can avoid oxidization reactions (such as browning) that can take place in the presence of air.

Therefore, the Applicant respectfully submits that the combination does not render the invention obvious and that there is no suggestion, motivation or incentive found in either Lockwood or Oates to make the combination and the rejection under Section 103 should be withdrawn.

b) Rejection of Claims 31-33, 38-39, 59-61, 69-74 and 76-79 under 35 U.S.C. § 103(a)

Claims 31-33, 38-39, 59-61, 69-74 and 76-79 were rejected under 35 U.S.C. § 103(a) as being obvious over *Scott* (U.S. No. 4,419,834) in view of *Lockwood* (U.S. No. 4,334,366).

Scott discloses a stationary perforated table where heated air is forced through the perforations. Endless chains separated by vanes are used to move the material

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across the perforated table. However, Scott does not disclose a conveyor, a particulate support or ultrasound as claimed by the Applicant. Nor are the conveyor, particulate support and ultrasound elements taught by Scott or Lockwood, and Lockwood teaches away from the claimed combination as explained in greater detail above.

Consequently, the claims recite elements that are not found in the combination proposed by the Examiner and the claims are not obvious in view of these references.

Furthermore, there is no incentive, suggestion or motivation to substitute the pulsed jet engine of Lockwood for the conventional burners and blowers of Scott because the volume of exhaust gas and heat created by the jet engine would exceed the safe temperatures causing the material to be scorched, and would exceed the pressures that the small housing 61 of FIG. 2 of Scott. Such excessive temperatures and pressures produced by the jet engine would not permit the Scott fluid bed to function as designed and would blow the material away from the perforated table and into the exhaust parts of the structure of the apparatus. The pulsed jet engine is configured for use with a revolving perforated drum with the material enclosed within and is not adaptable to a fluid table or perforated belt without substantial modifications and structural changes.

Another disincentive to the combination of Scott and Lockwood is the presence of a "support substrate" as recited in the Applicant's claims. Apart from the absence of a support substrate in the combination, the gas and heat from the jet engine would set the substrate in motion knocking the material from the support substrate and making it airborne. Furthermore, the noise emitted from the jet engine may also cause vibrations in the support substrate causing the separation of the material to be dried from the support prematurely.

Obviousness under Section 103 will generally not be found if the combination does not function as disclosed, substantial modifications have to be made, or the combination does not have all of the elements recited in the claims. Therefore, the Applicant respectfully requests that the rejection of Claims 31-33, 38-39, 59-61, 69-74

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and 76-79 under 35 U.S.C. § 103(a) be withdrawn.

c) Rejection of Claims 35, 36 and 80 under 35 U.S.C. § 103(a)

Claims 35, 36 and 80 were rejected under 35 U.S.C. § 103(a) as being obvious over *Scott* (U.S. No. 4,419,834) in view of *Lockwood* (U.S. No. 4,334,366) and further in view of *Ware* (U.S. No. 5,522,156).

In support of the rejection, the Examiner stated: "It would have been obvious to one of ordinary skill in the art to incorporate the plurality of spheres of *Ware* into the invention of *Scott*, in view of *Lockwood*, since all are directed to drying devices..." and "Scott ...included vanes capable of holding the spheres (Figure 2a, #64)..." In response, the Applicant respectfully disagrees that the recited combination provides all of the limitations provided by Claims 35, 36 and 80, and submits that there is no suggestion, incentive or motivation to make the cited combination.

As described above, there is no incentive to combine *Scott* and *Lockwood* because of the different characteristics of the Jet engine and heating units (air flow volume, temperatures and noise) as well as the closed and open chamber structures. Furthermore, there is no incentive, suggestion or motivation to add ultrasound or the spheres of *Ware* to the perforated table of *Scott* or the closed perforated drum of *Lockwood*. Both *Ware* and *Lockwood* have cylindrical drying chambers and are structurally and functionally incompatible with the fluid bed structure of *Scott*.

Note that there is no structure to hold the support substrate found in either *Scott* or *Lockwood*. The vanes (64) of FIG. 2a of *Scott* mentioned by the Examiner, are slightly elevated over the perforated table and the sides and top of the space between the vanes is open. The vanes of *Scott* are not capable of supporting the spheres of *Ware*. In the proposed combination, airflow from the jet engine directed through the table would set the support substrate in motion and knock the material off of the support substrate as well as disrupt or eliminate the function of the support.

Furthermore, the cited combination does not disclose "an ultrasound source" or a "conveyor configured to move said substrate through drying zones" as claimed by the

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Applicant. As described above the noise and exhaust of the jet engine of Lockwood does not produce "ultrasonic waves" as claimed.

Therefore, Claims 35, 36 and 80- recite subject matter that is not obvious in view of the cited combination. In addition, Claims 35, 36 and 80 depend on an independent claim that was shown to be allowable, these claims should also be allowable and the rejection under 35 U.S.C. § 103(a) should be withdrawn.

d) Rejection of Claims 35, 37 and 80 under 35 U.S.C. § 103(a)

Claims 35, 37 and 80 were rejected under 35 U.S.C. § 103(a) as being obvious over *Oates* (U.S. No. 3,214,844) in view of *Lockwood* (U.S. No. 4,334,366) and further in view of *Ware* (U.S. No. 5,522,156).

In support of the rejection, the Examiner stated, "Oates and Lockwood teach the above mentioned components...[and] Oates et al also teach a container (Figure 3, #58)." The Applicant respectfully disagrees and submits that there is no incentive provided in either of the Oates, Lockwood or Ware patents to make the combination for the reasons stated above. The addition of the Ware patent to the mix does not provide all of the limitations of the independent claims, and Claims 35, 37 and 80 as amended, and does not provide any incentive, suggestion or motivation to combine the sometimes incompatible elements of the cited patents. As discussed previously, all of the patents for fluid bed or perforated drum configurations cited by the Examiner have the limitation of requiring the heated air to be forced from beneath the perforated belt or bottom panel with sufficient velocity for the food particles to become airborne. The invention of the Applicant does not have this limitation. Furthermore, the airflow volumes, velocities and temperatures that are necessary to make the fluid bed of Scott or Oates function are substantially greater than those disclosed and claimed by the Applicant. The substitution of the jet engine for the heater and blower of Oates would substantially *increase* the air-flow and temperature conditions elevating the Ware spheres and setting them into motion. Therefore, the combination proposed by the Examiner would knock all of the material to be dried off of the spherical substrate during use thereby

causing inconsistent drying conditions and the potential for burning the material to be dried.

In addition, the Oates patent discloses an endless conveyor belt composed of shallow troughs (58) with perforated bottom panels (70). However, these troughs would not “contain” the support substrate during use because the forced air would blow the support substrate out of the troughs and into the exhaust ducts.

Accordingly, the back pressure, excessive temperature and air-flow and the absence of ultrasound are significant disincentives to making the proposed combination. Therefore, Claims 35, 37 and 80 are not obvious in view of the cited combination.

e) Rejection of Claim 75 under 35 U.S.C. § 103(a)

Claim 75, a depends from independent Claim 31, was rejected under 35 U.S.C. § 103(a) as being obvious over *Oates* (U.S. No. 3,214,844) in view of *Lockwood* (U.S. No. 4,334,366) and further in view of *Geromini et al* (U.S. No. 5,911,488). In support of the rejection, the Examiner stated that it would be obvious to one skilled in the art to “incorporate the vibrating table of Geromini et al into the invention of Oates in view of Lockwood...” However, since Claim 31 has been shown to be allowable, the Claims that depend from Claim 31 should also be allowable.

Furthermore, Claim 74 recites a “means for separating said food product from said substrate” and Claim 75 claims “ a vibrating perforated table” as the means for separating the food product from the support substrate.

Geromini et al., discloses a vibrating tray (18) that advances the material to be dried by the vibrations. At Col. 4, lines 21-25, of Geromini it states: “”...[t]he sticky particles are advanced on a perforated conveyor in the form of a vibrating table which advances the sticky particles by means of its vibrations.” (emphasis added). Accordingly, the vibrating table is the conveyor. Geromimi does not disclose a conveyor as claimed. The language of Claim 75 provides a limitation of separating the food product from the support substrate *after* drying. In contrast, the Geromini vibrating

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table would separate the food product from the substrate *before* drying.

Oates has no need of a vibrating table because it has a conveyor belt and the food material is removed from the fluid bed by the force of gravity. Lockwood has an enclosed perforated drum that must be emptied at the end of the process and there is no structure that would allow a vibrating table.

Therefore, Claim 75 cites structure that is not found in the Oates or Geromimi patents alone or in combination. The Applicant respectfully requests that the rejection be withdrawn.

4. Conclusion.

In view of the above, the new claims and each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

The Applicant also respectfully requests a telephone interview with the Examiner in the event that there are questions regarding this response, or if the next action on the merits is not an allowance of all pending claims.

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Respectfully submitted,



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Amendments to the Drawings:

The attached sheet of drawings includes changes to FIG. 7. This sheet, which includes FIG. 7, replaces the original sheet marked of FIG. 7. In new FIG. 7, previously omitted element number 82 has been added.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

